

SEQUENCE LISTING

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<120> Melan-A-Carrier-Conjugates

<130> 1700.0590000

<150> US 60/457,348

<151> 2003-03-26

<160> 94

<170> PatentIn version 3.2

<210> 1

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<212> DNA

<213> Artificial sequence

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<223> oligonucleotide G3-6

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<223> oligonucleotide G5-6

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gggggggacga tcgtcggggg g

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<223> oligonucleotide G6-6

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<223> oligonucleotide G7-7

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gggggggggac gatcgtcggg gggg

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<223> oligonucleotide G8-8

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gggggggggga cgatcgtcgg gggggg

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<211> 28

<212> DNA

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<223> oligonucleotide G9-9

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<211> 30

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<223> oligonucleotide G6

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 ggggggacgac gacgatcgtc gtcggggggg

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<210> 10
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 <212> PRT
 <213> Bacteriophage Q-beta

<400> 10

Ala Lys Leu Glu Thr Val Thr Leu Gly Asn Ile Gly Lys Asp Gly Lys
 1 5 10 15

Gln Thr Leu Val Leu Asn Pro Arg Gly Val Asn Pro Thr Asn Gly Val
 20 25 30

Ala Ser Leu Ser Gln Ala Gly Ala Val Pro Ala Leu Glu Lys Arg Val
 35 40 45

Thr Val Ser Val Ser Gln Pro Ser Arg Asn Arg Lys Asn Tyr Lys Val
 50 55 60

Gln Val Lys Ile Gln Asn Pro Thr Ala Cys Thr Ala Asn Gly Ser Cys
 65 70 75 80

Asp Pro Ser Val Thr Arg Gln Ala Tyr Ala Asp Val Thr Phe Ser Phe
 85 90 95

Thr Gln Tyr Ser Thr Asp Glu Glu Arg Ala Phe Val Arg Thr Glu Leu
 100 105 110

Ala Ala Leu Leu Ala Ser Pro Leu Leu Ile Asp Ala Ile Asp Gln Leu
 115 120 125

Asn Pro Ala Tyr
 130

<210> 11
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 <213> Bacteriophage Q-beta

<400> 11

Met Ala Lys Leu Glu Thr Val Thr Leu Gly Asn Ile Gly Lys Asp Gly
 1 5 10 15

Lys Gln Thr Leu Val Leu Asn Pro Arg Gly Val Asn Pro Thr Asn Gly
 20 25 30

Val Ala Ser Leu Ser Gln Ala Gly Ala Val Pro Ala Leu Glu Lys Arg
 35 40 45

Val Thr Val Ser Val Ser Gln Pro Ser Arg Asn Arg Lys Asn Tyr Lys
 50 55 60

Val Gln Val Lys Ile Gln Asn Pro Thr Ala Cys Thr Ala Asn Gly Ser
 65 70 75 80

Cys Asp Pro Ser Val Thr Arg Gln Ala Tyr Ala Asp Val Thr Phe Ser
 85 90 95

Phe Thr Gln Tyr Ser Thr Asp Glu Glu Arg Ala Phe Val Arg Thr Glu
 100 105 110

Leu Ala Ala Leu Leu Ala Ser Pro Leu Leu Ile Asp Ala Ile Asp Gln
 115 120 125

Leu Asn Pro Ala Tyr Trp Leu Leu Ile Ala Gly Gly Gly Ser Gly Ser
 130 135 140

Lys Pro Asp Pro Val Ile Pro Asp Pro Pro Ile Asp Pro Pro Pro Gly
 145 150 155 160

Thr Gly Lys Tyr Thr Cys Pro Phe Ala Ile Trp Ser Leu Glu Glu Val
 165 170 175

Tyr Glu Pro Pro Thr Lys Asn Arg Pro Trp Pro Ile Tyr Asn Ala Val
 180 185 190

Glu Leu Gln Pro Arg Glu Phe Asp Val Ala Leu Lys Asp Leu Leu Gly
 195 200 205

Asn Thr Lys Trp Arg Asp Trp Asp Ser Arg Leu Ser Tyr Thr Thr Phe
 210 215 220

Arg Gly Cys Arg Gly Asn Gly Tyr Ile Asp Leu Asp Ala Thr Tyr Leu
 225 230 235 240

Ala Thr Asp Gln Ala Met Arg Asp Gln Lys Tyr Asp Ile Arg Glu Gly
 245 250 255

Lys Lys Pro Gly Ala Phe Gly Asn Ile Glu Arg Phe Ile Tyr Leu Lys
 260 265 270

Ser Ile Asn Ala Tyr Cys Ser Leu Ser Asp Ile Ala Ala Tyr His Ala
 275 280 285

Asp Gly Val Ile Val Gly Phe Trp Arg Asp Pro Ser Ser Gly Gly Ala
 290 295 300

Ile Pro Phe Asp Phe Thr Lys Phe Asp Lys Thr Lys Cys Pro Ile Gln
 305 310 315 320

Ala Val Ile Val Val Pro Arg Ala
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<210> 12
 <211> 362
 <212> PRT
 <213> BK virus

<400> 12

Met Ala Pro Thr Lys Arg Lys Gly Glu Cys Pro Gly Ala Ala Pro Lys
 1 5 10 15

Lys Pro Lys Glu Pro Val Gln Val Pro Lys Leu Leu Ile Lys Gly Gly
 20 25 30

Val Glu Val Leu Glu Val Lys Thr Gly Val Asp Ala Ile Thr Glu Val
 35 40 45

Glu Cys Phe Leu Asn Pro Glu Met Gly Asp Pro Asp Asp Asn Leu Arg
 50 55 60

Gly Tyr Ser Gln His Leu Ser Ala Glu Asn Ala Phe Glu Ser Asp Ser
 65 70 75 80

Pro Asp Arg Lys Met Leu Pro Cys Tyr Ser Thr Ala Arg Ile Pro Leu
 85 90 95

Pro Asn Leu Asn Glu Asp Leu Thr Cys Gly Asn Leu Leu Met Trp Glu
 100 105 110

Ala Val Thr Val Lys Thr Glu Val Ile Gly Ile Thr Ser Met Leu Asn
 115 120 125

Leu His Ala Gly Ser Gln Lys Val His Glu Asn Gly Gly Gly Lys Pro
 130 135 140

Val Gln Gly Ser Asn Phe His Phe Phe Ala Val Gly Gly Asp Pro Leu

145		150		155		160
Glu Met Gln Gly Val Leu Met Asn Tyr Arg Thr Lys Tyr Pro Gln Gly						
	165			170		175
Thr Ile Thr Pro Lys Asn Pro Thr Ala Gln Ser Gln Val Met Asn Thr						
	180			185		190
Asp His Lys Ala Tyr Leu Asp Lys Asn Asn Ala Tyr Pro Val Glu Cys						
	195			200		205
Trp Ile Pro Asp Pro Ser Arg Asn Glu Asn Thr Arg Tyr Phe Gly Thr						
	210			215		220
Tyr Thr Gly Gly Glu Asn Val Pro Pro Val Leu His Val Thr Asn Thr						
	225			230		235
						240
Ala Thr Thr Val Leu Leu Asp Glu Gln Gly Val Gly Pro Leu Cys Lys						
	245			250		255
Ala Asp Ser Leu Tyr Val Ser Ala Ala Asp Ile Cys Gly Leu Phe Thr						
	260			265		270
Asn Ser Ser Gly Thr Gln Gln Trp Arg Gly Leu Ala Arg Tyr Phe Lys						
	275			280		285
Ile Arg Leu Arg Lys Arg Ser Val Lys Asn Pro Tyr Pro Ile Ser Phe						
	290			295		300
Leu Leu Ser Asp Leu Ile Asn Arg Arg Thr Gln Lys Val Asp Gly Gln						
	305			310		315
						320
Pro Met Tyr Gly Met Glu Ser Gln Val Glu Glu Val Arg Val Phe Asp						
	325			330		335
Gly Thr Glu Gln Leu Pro Gly Asp Pro Asp Met Ile Arg Tyr Ile Asp						
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Arg Gln Gly Gln Leu Gln Thr Lys Met Val						
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<210> 13
 <211> 130
 <212> PRT
 <213> Bacteriophage fr
 <400> 13

Met Ala Ser Asn Phe Glu Glu Phe Val Leu Val Asp Asn Gly Gly Thr
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Gly Asp Val Lys Val Ala Pro Ser Asn Phe Ala Asn Gly Val Ala Glu
20 25 30

Trp Ile Ser Ser Asn Ser Arg Ser Gln Ala Tyr Lys Val Thr Cys Ser
35 40 45

Val Arg Gln Ser Ser Ala Asn Asn Arg Lys Tyr Thr Val Lys Val Glu
50 55 60

Val Pro Lys Val Ala Thr Gln Val Gln Gly Gly Val Glu Leu Pro Val
65 70 75 80

Ala Ala Trp Arg Ser Tyr Met Asn Met Glu Leu Thr Ile Pro Val Phe
85 90 95

Ala Thr Asn Asp Asp Cys Ala Leu Ile Val Lys Ala Leu Gln Gly Thr
100 105 110

Phe Lys Thr Gly Asn Pro Ile Ala Thr Ala Ile Ala Ala Asn Ser Gly
115 120 125

Ile Tyr
130

<210> 14
<211> 130
<212> PRT
<213> Bacteriophage GA

<400> 14

Met Ala Thr Leu Arg Ser Phe Val Leu Val Asp Asn Gly Gly Thr Gly
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Asn Val Thr Val Val Pro Val Ser Asn Ala Asn Gly Val Ala Glu Trp
20 25 30

Leu Ser Asn Asn Ser Arg Ser Gln Ala Tyr Arg Val Thr Ala Ser Tyr
35 40 45

Arg Ala Ser Gly Ala Asp Lys Arg Lys Tyr Ala Ile Lys Leu Glu Val
50 55 60

Pro Lys Ile Val Thr Gln Val Val Asn Gly Val Glu Leu Pro Gly Ser

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<210> 15
<211> 594
<212> DNA
<213> Artificial Sequence

<220>
<223> HBcAg containing p33 from LCMV

<220>
<221> CDS
<222> (1)..(594)
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tcg	ttt	ttg	cct	tct	gac	ttc	ttt	cct	tcc	gtc	aga	gat	ctc	cta	gac	96
Ser	Phe	Leu	Pro	Ser	Asp	Phe	Phe	Pro	Ser	Val	Arg	Asp	Leu	Leu	Asp	
			20					25					30			
acc	gcc	tca	gct	ctg	tat	cga	gaa	gcc	tta	gag	tct	cct	gag	cat	tgc	144
Thr	Ala	Ser	Ala	Leu	Tyr	Arg	Glu	Ala	Leu	Glu	Ser	Pro	Glu	His	Cys	
		35					40					45				
tca	cct	cac	cat	act	gca	ctc	agg	caa	gcc	att	ctc	tgc	tgg	ggg	gaa	192
Ser	Pro	His	His	Thr	Ala	Leu	Arg	Gln	Ala	Ile	Leu	Cys	Trp	Gly	Glu	
	50					55					60					
ttg	atg	act	cta	gct	acc	tgg	gtg	ggt	aat	aat	ttg	gaa	gat	cca	gca	240
Leu	Met	Thr	Leu	Ala	Thr	Trp	Val	Gly	Asn	Asn	Leu	Glu	Asp	Pro	Ala	
65					70					75					80	
tcc	agg	gat	cta	gta	gtc	aat	tat	gtt	aat	act	aac	atg	ggg	tta	aag	288
Ser	Arg	Asp	Leu	Val	Val	Asn	Tyr	Val	Asn	Thr	Asn	Met	Gly	Leu	Lys	
				85					90					95		
atc	agg	caa	cta	ttg	tgg	ttt	cat	ata	tct	tgc	ctt	act	ttt	gga	aga	336
Ile	Arg	Gln	Leu	Leu	Trp	Phe	His	Ile	Ser	Cys	Leu	Thr	Phe	Gly	Arg	
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384

432

480

528

576

594

<210>	16
<211>	197
<212>	PRT

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<220>
<223> HBcAg containing p33 from LCMV
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<400> 16

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu
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Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp
20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys
35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu
50 55 60

Leu Met Thr Leu Ala Thr Trp Val Gly Asn Asn Leu Glu Asp Pro Ala
65 70 75 80

Ser Arg Asp Leu Val Val Asn Tyr Val Asn Thr Asn Met Gly Leu Lys
85 90 95

Ile Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg
100 105 110

Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro
 130 135 140

Glu Thr Thr Val Val Arg Arg Arg Asp Arg Gly Arg Ser Pro Arg Arg
 145 150 155 160

Arg Thr Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg
 165 170 175

Arg Ser Gln Ser Arg Glu Ser Gln Cys Leu Leu Leu Lys Ala Val Tyr
 180 185 190

Asn Phe Ala Thr Met
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<210> 17
 <211> 246
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> dsDNA fragment for packaging and stabilization of BKV

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 tacacatcca ttcattcatgg tgtggtggag gttgacgccg ctgtcacccc agaggagcgc 120
 cacctgtcca agatgcagca gaacggctac gaaaatccaa cctacaagtt ctttgagcag 180
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 acagtg 246

<210> 18
 <211> 5
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> GGKGG Linker

<400> 18

Gly Gly Lys Gly Gly
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<210> 19

<211> 128
 <212> PRT
 <213> Bacteriophage PP7

<400> 19

Met Ser Lys Thr Ile Val Leu Ser Val Gly Glu Ala Thr Arg Thr Leu
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Thr Glu Ile Gln Ser Thr Ala Asp Arg Gln Ile Phe Glu Glu Lys Val
 20 25 30

Gly Pro Leu Val Gly Arg Leu Arg Leu Thr Ala Ser Leu Arg Gln Asn
 35 40 45

Gly Ala Lys Thr Ala Tyr Arg Val Asn Leu Lys Leu Asp Gln Ala Asp
 50 55 60

Val Val Asp Cys Ser Thr Ser Val Cys Gly Glu Leu Pro Lys Val Arg
 65 70 75 80

Tyr Thr Gln Val Trp Ser His Asp Val Thr Ile Val Ala Asn Ser Thr
 85 90 95

Glu Ala Ser Arg Lys Ser Leu Tyr Asp Leu Thr Lys Ser Leu Val Ala
 100 105 110

Thr Ser Gln Val Glu Asp Leu Val Val Asn Leu Val Pro Leu Gly Arg
 115 120 125

<210> 20
 <211> 132
 <212> PRT
 <213> Bacteriophage Q-beta

<400> 20

Ala Lys Leu Glu Thr Val Thr Leu Gly Asn Ile Gly Arg Asp Gly Lys
 1 5 10 15

Gln Thr Leu Val Leu Asn Pro Arg Gly Val Asn Pro Thr Asn Gly Val
 20 25 30

Ala Ser Leu Ser Gln Ala Gly Ala Val Pro Ala Leu Glu Lys Arg Val
 35 40 45

Thr Val Ser Val Ser Gln Pro Ser Arg Asn Arg Lys Asn Tyr Lys Val
 50 55 60

Gln Val Lys Ile Gln Asn Pro Thr Ala Cys Thr Ala Asn Gly Ser Cys
65 70 75 80

Asp Pro Ser Val Thr Arg Gln Lys Tyr Ala Asp Val Thr Phe Ser Phe
85 90 95

Thr Gln Tyr Ser Thr Asp Glu Glu Arg Ala Phe Val Arg Thr Glu Leu
100 105 110

Ala Ala Leu Leu Ala Ser Pro Leu Leu Ile Asp Ala Ile Asp Gln Leu
115 120 125

Asn Pro Ala Tyr
130

<210> 21
<211> 132
<212> PRT
<213> Bacteriophage Q-beta

<400> 21

Ala Lys Leu Glu Thr Val Thr Leu Gly Lys Ile Gly Lys Asp Gly Lys
1 5 10 15

Gln Thr Leu Val Leu Asn Pro Arg Gly Val Asn Pro Thr Asn Gly Val
20 25 30

Ala Ser Leu Ser Gln Ala Gly Ala Val Pro Ala Leu Glu Lys Arg Val
35 40 45

Thr Val Ser Val Ser Gln Pro Ser Arg Asn Arg Lys Asn Tyr Lys Val
50 55 60

Gln Val Lys Ile Gln Asn Pro Thr Ala Cys Thr Ala Asn Gly Ser Cys
65 70 75 80

Asp Pro Ser Val Thr Arg Gln Lys Tyr Ala Asp Val Thr Phe Ser Phe
85 90 95

Thr Gln Tyr Ser Thr Asp Glu Glu Arg Ala Phe Val Arg Thr Glu Leu
100 105 110

Ala Ala Leu Leu Ala Ser Pro Leu Leu Ile Asp Ala Ile Asp Gln Leu
115 120 125

Asn Pro Ala Tyr
130

<210> 22
 <211> 132
 <212> PRT
 <213> Bacteriophage Q-beta

<400> 22

Ala Arg Leu Glu Thr Val Thr Leu Gly Asn Ile Gly Arg Asp Gly Lys
 1 5 10 15

Gln Thr Leu Val Leu Asn Pro Arg Gly Val Asn Pro Thr Asn Gly Val
 20 25 30

Ala Ser Leu Ser Gln Ala Gly Ala Val Pro Ala Leu Glu Lys Arg Val
 35 40 45

Thr Val Ser Val Ser Gln Pro Ser Arg Asn Arg Lys Asn Tyr Lys Val
 50 55 60

Gln Val Lys Ile Gln Asn Pro Thr Ala Cys Thr Ala Asn Gly Ser Cys
 65 70 75 80

Asp Pro Ser Val Thr Arg Gln Lys Tyr Ala Asp Val Thr Phe Ser Phe
 85 90 95

Thr Gln Tyr Ser Thr Asp Glu Glu Arg Ala Phe Val Arg Thr Glu Leu
 100 105 110

Ala Ala Leu Leu Ala Ser Pro Leu Leu Ile Asp Ala Ile Asp Gln Leu
 115 120 125

Asn Pro Ala Tyr
 130

<210> 23
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 <213> Bacteriophage Q-beta

<400> 23

Ala Lys Leu Glu Thr Val Thr Leu Gly Asn Ile Gly Lys Asp Gly Arg
 1 5 10 15

Gln Thr Leu Val Leu Asn Pro Arg Gly Val Asn Pro Thr Asn Gly Val
 20 25 30

Ala Ser Leu Ser Gln Ala Gly Ala Val Pro Ala Leu Glu Lys Arg Val

35 40 45
 Thr Val Ser Val Ser Gln Pro Ser Arg Asn Arg Lys Asn Tyr Lys Val
 50 55 60
 Gln Val Lys Ile Gln Asn Pro Thr Ala Cys Thr Ala Asn Gly Ser Cys
 65 70 75 80
 Asp Pro Ser Val Thr Arg Gln Lys Tyr Ala Asp Val Thr Phe Ser Phe
 85 90 95
 Thr Gln Tyr Ser Thr Asp Glu Glu Arg Ala Phe Val Arg Thr Glu Leu
 100 105 110
 Ala Ala Leu Leu Ala Ser Pro Leu Leu Ile Asp Ala Ile Asp Gln Leu
 115 120 125
 Asn Pro Ala Tyr
 130

 <210> 24
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 <213> Bacteriophage Q-beta

 <400> 24
 Ala Arg Leu Glu Thr Val Thr Leu Gly Asn Ile Gly Lys Asp Gly Arg
 1 5 10 15
 Gln Thr Leu Val Leu Asn Pro Arg Gly Val Asn Pro Thr Asn Gly Val
 20 25 30
 Ala Ser Leu Ser Gln Ala Gly Ala Val Pro Ala Leu Glu Lys Arg Val
 35 40 45
 Thr Val Ser Val Ser Gln Pro Ser Arg Asn Arg Lys Asn Tyr Lys Val
 50 55 60
 Gln Val Lys Ile Gln Asn Pro Thr Ala Cys Thr Ala Asn Gly Ser Cys
 65 70 75 80
 Asp Pro Ser Val Thr Arg Gln Lys Tyr Ala Asp Val Thr Phe Ser Phe
 85 90 95
 Thr Gln Tyr Ser Thr Asp Glu Glu Arg Ala Phe Val Arg Thr Glu Leu
 100 105 110

Ala Ala Leu Leu Ala Ser Pro Leu Leu Ile Asp Ala Ile Asp Gln Leu
 115 120 125

Asn Pro Ala Tyr
 130

<210> 25
 <211> 184
 <212> PRT
 <213> Hepatitis B virus

<400> 25

Met Asp Ile Asp Pro Tyr Glu Phe Gly Ala Thr Val Glu Leu Leu Ser
 1 5 10 15

Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp Thr
 20 25 30

Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys Ser
 35 40 45

Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu Leu
 50 55 60

Met Thr Leu Ala Thr Trp Val Gly Asn Asn Leu Glu Asp Pro Ala Ser
 65 70 75 80

Arg Asp Leu Val Val Asn Tyr Val Asn Thr Asn Met Gly Leu Lys Ile
 85 90 95

Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg Glu
 100 105 110

Thr Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr Pro
 115 120 125

Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro Glu
 130 135 140

Thr Thr Val Val Arg Arg Arg Asp Arg Gly Arg Ser Pro Arg Arg Arg
 145 150 155 160

Thr Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg
 165 170 175

Ser Gln Ser Arg Glu Ser Gln Cys

180

<210> 26
 <211> 213
 <212> PRT
 <213> Hepatitis B virus

<400> 26

Met Gln Leu Phe His Leu Cys Leu Ile Ile Ser Cys Ser Cys Pro Thr
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Val Gln Ala Ser Lys Leu Cys Leu Gly Trp Leu Trp Gly Met Asp Ile
 20 25 30

Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu Ser Phe Leu
 35 40 45

Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp Thr Ala Ser
 50 55 60

Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys Ser Pro His
 65 70 75 80

His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Asp Leu Met Asn
 85 90 95

Leu Ala Thr Trp Val Gly Gly Asn Leu Glu Asp Pro Val Ser Arg Asp
 100 105 110

Leu Val Val Gly Tyr Val Asn Thr Thr Val Gly Leu Lys Phe Arg Gln
 115 120 125

Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg Glu Thr Val
 130 135 140

Ile Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr Pro Pro Ala
 145 150 155 160

Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro Glu Thr Thr
 165 170 175

Val Val Arg Arg Arg Gly Arg Ser Pro Arg Arg Arg Thr Pro Ser Pro
 180 185 190

Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser Gln Ser
 195 200 205

Arg Glu Ser Gln Cys
210

<210> 27
<211> 188
<212> PRT
<213> Hepatitis B virus

<400> 27

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ser Ser Tyr Gln Leu Leu
1 5 10 15

Asn Phe Leu Pro Leu Asp Phe Phe Pro Asp Leu Asn Ala Leu Val Asp
20 25 30

Thr Ala Thr Ala Leu Tyr Glu Glu Glu Leu Thr Gly Arg Glu His Cys
35 40 45

Ser Pro His His Thr Ala Ile Arg Gln Ala Leu Val Cys Trp Asp Glu
50 55 60

Leu Thr Lys Leu Ile Ala Trp Met Ser Ser Asn Ile Thr Ser Glu Gln
65 70 75 80

Val Arg Thr Ile Ile Val Asn His Val Asn Asp Thr Trp Gly Leu Lys
85 90 95

Val Arg Gln Ser Leu Trp Phe His Leu Ser Cys Leu Thr Phe Gly Gln
100 105 110

His Thr Val Gln Glu Phe Leu Val Ser Phe Gly Val Trp Ile Arg Thr
115 120 125

Pro Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro
130 135 140

Glu His Thr Val Ile Arg Arg Arg Gly Gly Ala Arg Ala Ser Arg Ser
145 150 155 160

Pro Arg Arg Arg Thr Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro
165 170 175

Arg Arg Arg Arg Ser Gln Ser Pro Ser Thr Asn Cys
180 185

<210> 28

<211> 185
 <212> PRT
 <213> Hepatitis B virus

<400> 28

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp
 20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys
 35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu
 50 55 60

Leu Met Thr Leu Ala Thr Trp Val Gly Asn Asn Leu Glu Asp Pro Ala
 65 70 75 80

Ser Arg Asp Leu Val Val Asn Tyr Val Asn Thr Asn Met Gly Leu Lys
 85 90 95

Ile Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg
 100 105 110

Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro
 130 135 140

Glu Thr Thr Val Val Arg Arg Arg Asp Arg Gly Arg Ser Pro Arg Arg
 145 150 155 160

Arg Thr Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg
 165 170 175

Arg Ser Gln Ser Arg Glu Ser Gln Cys
 180 185

<210> 29
 <211> 152
 <212> PRT
 <213> Hepatitis B virus

<400> 29

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu
1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp
20 25 30

Thr Ala Ala Ala Leu Tyr Arg Asp Ala Leu Glu Ser Pro Glu His Cys
35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Asp
50 55 60

Leu Met Thr Leu Ala Thr Trp Val Gly Thr Asn Leu Glu Asp Gly Gly
65 70 75 80

Lys Gly Gly Ser Arg Asp Leu Val Val Ser Tyr Val Asn Thr Asn Val
85 90 95

Gly Leu Lys Phe Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr
100 105 110

Phe Gly Arg Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp
115 120 125

Ile Arg Thr Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser
130 135 140

Thr Leu Pro Glu Thr Thr Val Val
145 150

<210> 30
<211> 3635
<212> DNA
<213> Artificial Sequence

<220>
<223> plasmid pAP283-58

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ggaaaatcac atggcaaata agccaatgca accgatcaca tctacagcaa ataaaattgt 180
gtggtcggat ccaactcggt tatcaactac attttcagca agtctgttac gccaacgtgt 240
taaagttggg atagccgaac tgaataatgt ttcagggtcaa tatgtatctg tttataagcg 300
tcctgcacct aaaccggaag gttgtgcaga tgccctgtgtc attatgccga atgaaaacca 360

atccattcgc	acagtgattt	cagggtcagc	cgaaaacttg	gctaccttaa	aagcagaatg	420
ggaaactcac	aaacgtaacg	ttgacacact	cttcgcgagc	ggcaacgccg	gtttgggttt	480
ccttgaccct	actgcggtta	tcgtatcgtc	tgatactact	gcttaagctt	gtattctata	540
gtgtcaccta	aatcgatatg	gtatgataca	taaggttatg	tattaattgt	agccgcgttc	600
taacgacaat	atgtacaagc	ctaatttgtg	agcatctggc	ttactgaagc	agaccctatc	660
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<400> 31

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 35 40 45
 Gly Gln Tyr Val Ser Val Tyr Lys Arg Pro Ala Pro Lys Pro Glu Gly
 50 55 60
 Cys Ala Asp Ala Cys Val Ile Met Pro Asn Glu Asn Gln Ser Ile Arg
 65 70 75 80
 Thr Val Ile Ser Gly Ser Ala Glu Asn Leu Ala Thr Leu Lys Ala Glu
 85 90 95
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<210> 32
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 35 40 45
 Gly Gln Tyr Val Ser Val Tyr Lys Arg Pro Ala Pro Lys Pro Glu Gly
 50 55 60

Cys Ala Asp Ala Cys Val Ile Met Pro Asn Glu Asn Gln Ser Ile Arg
65 70 75 80

Thr Val Ile Ser Gly Ser Ala Glu Asn Leu Ala Thr Leu Lys Ala Glu
85 90 95

Trp Glu Thr His Lys Arg Asn Val Asp Thr Leu Phe Ala Ser Gly Asn
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Thr Thr Ala
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<210> 35
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<220>
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<400> 35
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<210> 36
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<220>
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<400> 36
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<210> 37
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<220>
<223> B-CpG

<400> 37
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<210> 38
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<223> NKCpGpt

<400> 38
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<400> 39
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<220>
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<220>
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<210> 44
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<220>
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<210> 47

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<223> CyCyCy

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aataattcca tgacgttcct gaataattcc 150

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<211> 253

<212> DNA

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gataccgtcg acc 253

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<210> 51
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 <212> PRT
 <213> Artificial sequence

<220>
 <223> Melan A 16-35 A/L

<400> 51

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Ile Leu Thr Val
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<210> 52
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 <212> PRT
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<220>
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<400> 52

Ser Tyr Thr Thr Ala Glu Glu Leu Ala Gly Ile Gly Ile Leu Thr Val
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Ile Leu Gly Val Leu
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<210> 53
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<220>
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<400> 53

Glu Leu Ala Gly Ile Gly Ile Leu Thr Val Ile Leu Gly Val
 1 5 10

<210> 54
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 <212> PRT
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<220>
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<400> 54

Cys Gly His Gly His Ser Tyr Thr Thr Ala Glu Glu Ala Ala Gly Ile
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Gly Ile Leu Thr Val
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<210> 55
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<220>
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<400> 55

Cys Gly His Gly His Ser Tyr Thr Thr Ala Glu Glu Leu Ala Gly Ile
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Gly Ile Leu Thr Val
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<210> 56
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<220>
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Cys Gly Gly Glu Ala Ala Gly Ile Gly Ile Leu Thr Val
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<210> 57
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<220>
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<210> 59
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<220>
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<400> 59

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Val Leu

<210> 60
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<220>
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<400> 60

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<222> (1)..(1)
<223> Glycine can be repeated from zero to five times

<220>
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<222> (3)..(3)
<223> Glycine can be repeated from zero to ten times

<220>
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<222> (4)..(4)
<223> Serine can be repeated from zero to two times

<220>
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<222> (5)..(9)
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<400> 62

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<210> 63
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<220>
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<222> (1)..(1)
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<220>
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<223> Serine can be repeated from zero to two times

<220>

<221> REPEAT
 <222> (3)..(7)
 <223> These residues can be repeated from zero to three times as a group

<220>
 <221> REPEAT
 <222> (8)..(8)
 <223> Glycine can be repeated from zero to eight times

<220>
 <221> REPEAT
 <222> (10)..(10)
 <223> Glycine can be repeated from zero to five times

<400> 63

Gly Ser Gly Gly Gly Gly Ser Gly Cys Gly
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<210> 64
 <211> 5
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Glycine serine linker

<400> 64

Gly Gly Gly Gly Ser
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<210> 65
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<220>
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<220>
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<400> 66

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<220>
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<400> 67

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Pro

<210> 68
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<220>
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<400> 68

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Cys Gly

<210> 69
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<220>
 <223> N-terminal glycine linker

<400> 69

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1 5

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Gly Gly Lys Lys Gly Cys
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Cys Gly Lys Lys Gly Gly
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Cys Gly Lys Lys Gly Gly
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1 5

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Gly Gly Lys Lys Gly Cys
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Gly Gly Glu Asp Gly Cys
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Gly Gly Cys Gly
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Glu Ala Ala Gly Ile Gly Ile Leu Thr Val
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Ala Ala Gly Ile Gly Ile Leu Thr Val

1 5

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Lys Ala Val Tyr Asn Phe Ala Thr Met
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Cys Gly Gly Lys Ala Val Tyr Asn Phe Ala Thr Met
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Lys Ala Val Tyr Asn Phe Ala Thr Met Gly Gly Cys
 1 5 10

<210> 83
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Cys Gly Gly Gly Ser Glu Glu Ile Arg Ser Leu Tyr Asn Thr Val Ala
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Thr Leu

<210> 84
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Leu Ala Gly Ile Gly Ile Leu Thr Val
 1 5

<210> 85
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Met Ala Gly Ile Gly Ile Leu Thr Val
 1 5

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Glu Ala Met Gly Ile Gly Ile Leu Thr Val
 1 5 10

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<400> 87

Glu Met Ala Gly Ile Gly Ile Leu Thr Val
 1 5 10

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<400> 88

Tyr Ala Ala Gly Ile Gly Ile Leu Thr Val
 1 5 10

<210> 89
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<400> 89

Phe Ala Ala Gly Ile Gly Ile Leu Thr Val
 1 5 10

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<400> 90

Leu Pro Tyr Leu Gly Trp Leu Val Phe
1 5

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<211> 118

<212> PRT

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Met Pro Arg Glu Asp Ala His Phe Ile Tyr Gly Tyr Pro Lys Lys Gly
1 5 10 15

His Gly His Ser Tyr Thr Thr Ala Glu Glu Ala Ala Gly Ile Gly Ile
20 25 30

Leu Thr Val Ile Leu Gly Val Leu Leu Leu Ile Gly Cys Trp Tyr Cys
35 40 45

Arg Arg Arg Asn Gly Tyr Arg Ala Leu Met Asp Lys Ser Leu His Val
50 55 60

Gly Thr Gln Cys Ala Leu Thr Arg Arg Cys Pro Gln Glu Gly Phe Asp
65 70 75 80

His Arg Asp Ser Lys Val Ser Leu Gln Glu Lys Asn Cys Glu Pro Val
85 90 95

Val Pro Asn Ala Pro Pro Ala Tyr Glu Lys Leu Ser Ala Glu Gln Ser
100 105 110

Pro Pro Pro Tyr Ser Pro
115

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Cys Ser Pro Lys Ser Leu Glu Leu Ala Gly Ile Gly Ile Leu Thr Val
1 5 10 15

<210> 93

<211> 18

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Glu Leu Ala Gly Ile Gly Ile Leu Thr Val Ile Leu Gly Val Leu Gly
 1 5 10 15

Gly Cys

<210> 94
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<400> 94

Met Pro Arg Glu Asp Ala His Phe Ile Tyr Gly Tyr Pro Lys Lys Gly
 1 5 10 15

His Gly His Ser Tyr Thr Thr Ala Glu Glu Leu Ala Gly Ile Gly Ile
 20 25 30

Leu Thr Val Ile Leu Gly Val Leu Leu Leu Ile Gly Cys Trp Tyr Cys
 35 40 45

Arg Arg Arg Asn Gly Tyr Arg Ala Leu Met Asp Lys Ser Leu His Val
 50 55 60

Gly Thr Gln Cys Ala Leu Thr Arg Arg Cys Pro Gln Glu Gly Phe Asp
 65 70 75 80

His Arg Asp Ser Lys Val Ser Leu Gln Glu Lys Asn Cys Glu Pro Val
 85 90 95

Val Pro Asn Ala Pro Pro Ala Tyr Glu Lys Leu Ser Ala Glu Gln Ser
 100 105 110

Pro Pro Pro Tyr Ser Pro
 115